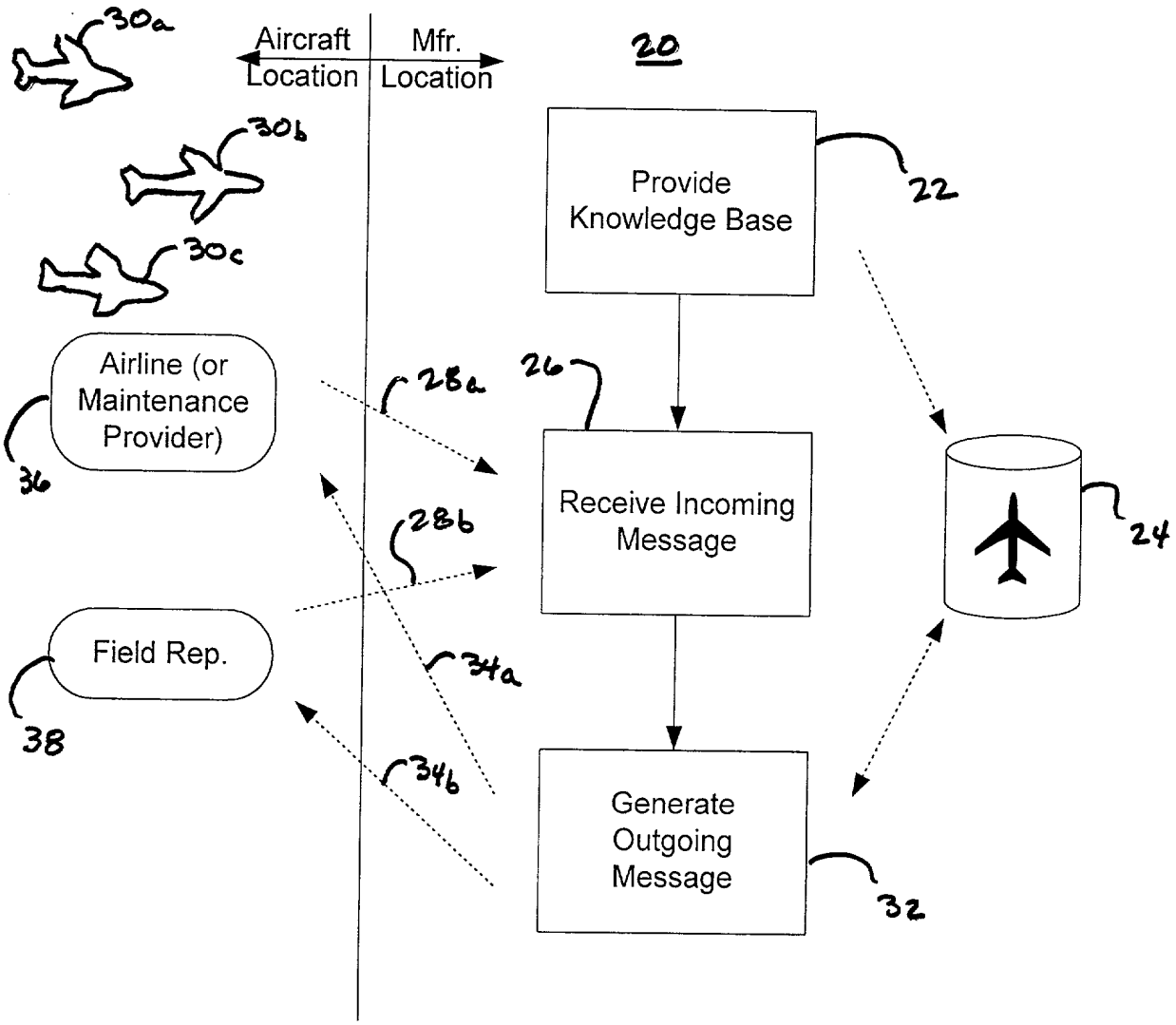
30a
30b
30c
Aircraft Location
Mfr. Location
20
Provide Knowledge Base
22
Airline (or Maintenance Provider)
36
28a
26
Receive Incoming Message
24
28b
Field Rep.
38
34a
34b
Generate Outgoing Message
32

FIG. 1

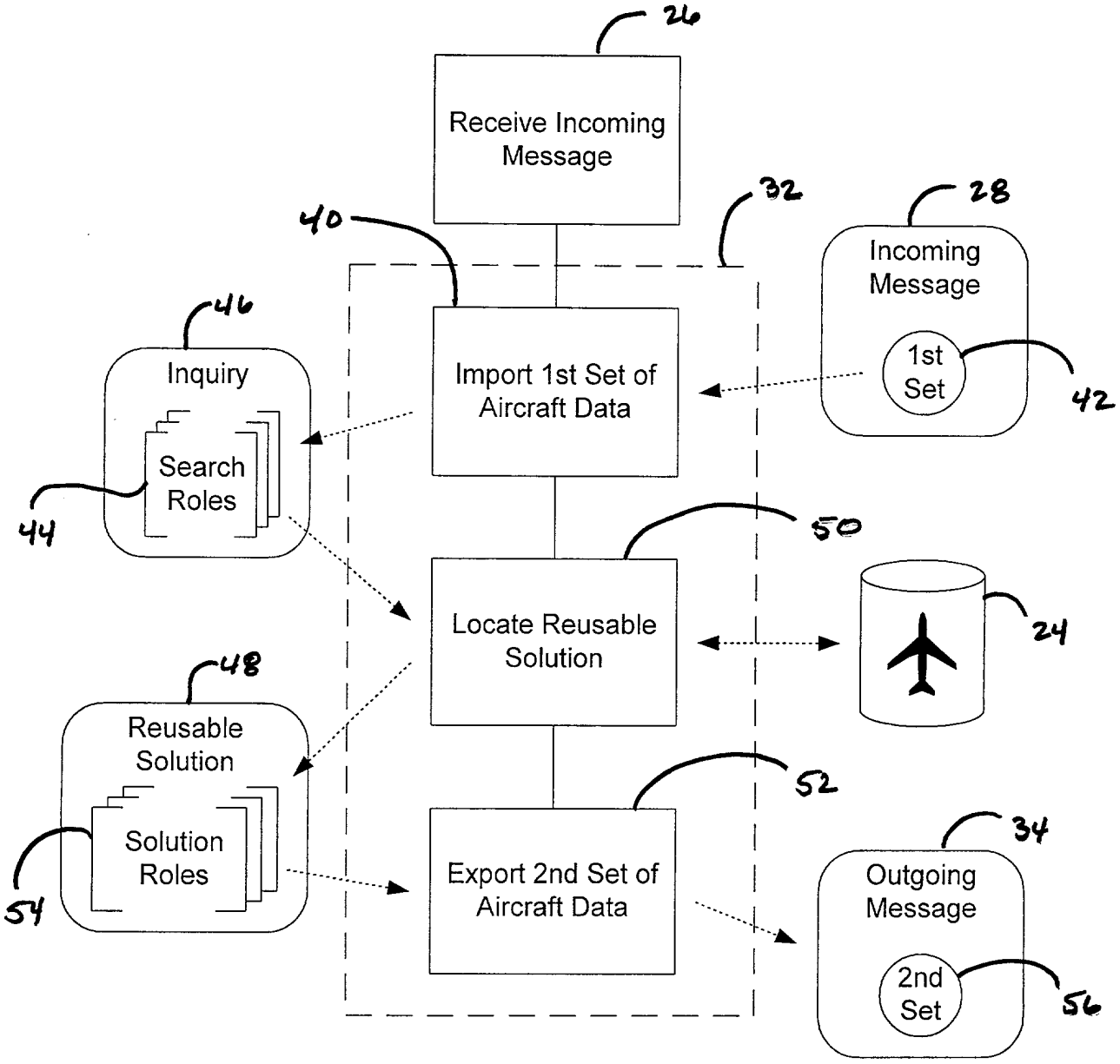
26
Receive Incoming Message
40
32
28
Incoming Message
1st Set
42
46
Inquiry
Search Roles
44
Import 1st Set of Aircraft Data
50
Locate Reusable Solution
24
48
Reusable Solution
Solution Roles
54
52
Export 2nd Set of Aircraft Data
34
Outgoing Message
2nd Set
56

FIG. 2

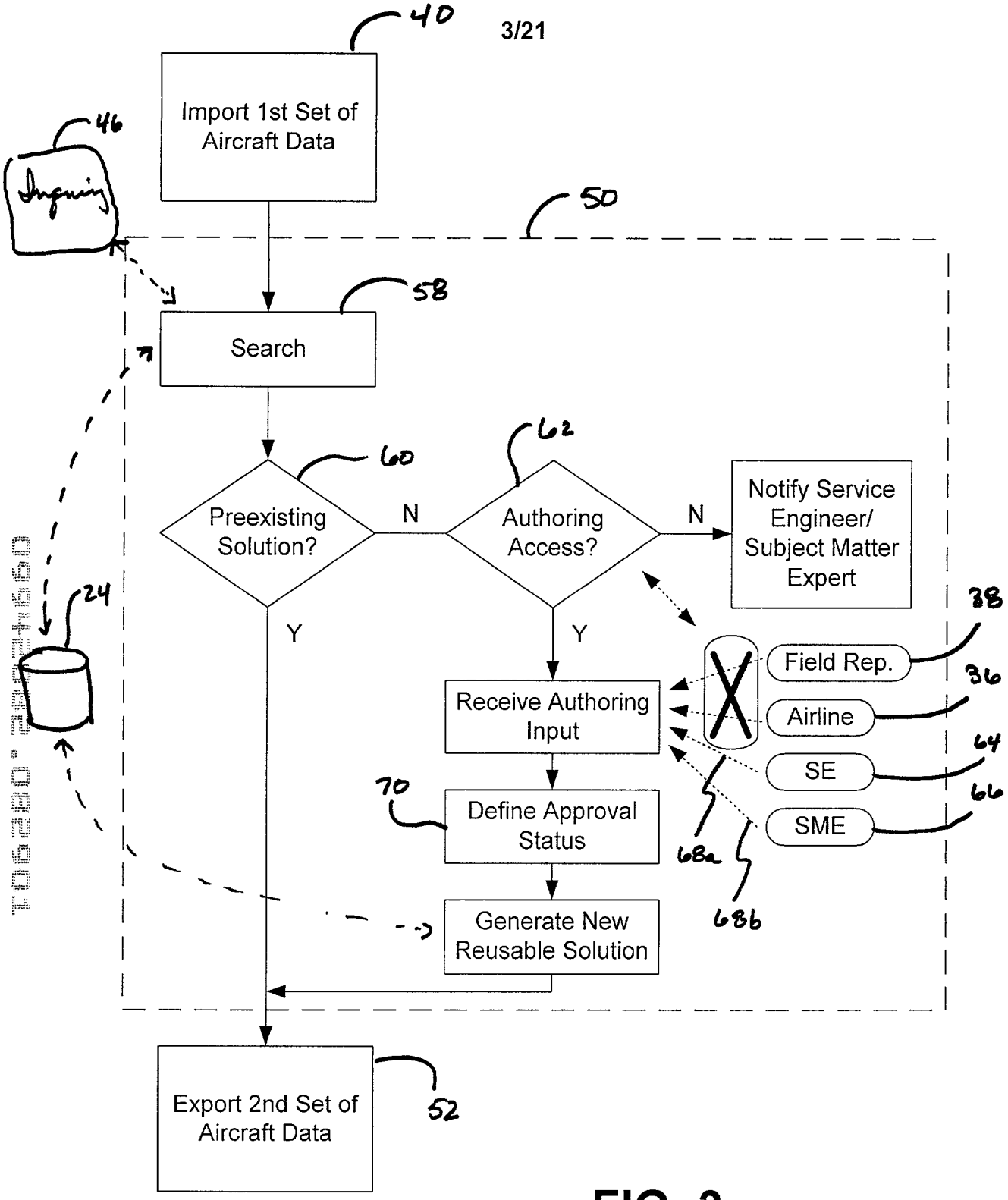
40
Import 1st Set of Aircraft Data
46
Inquiry
50
58
Search
60
Preexisting Solution?
N
62
Authoring Access?
N
Notify Service Engineer/ Subject Matter Expert
Y
Y
24
38
Field Rep.
36
Airline
64
SE
66
SME
Receive Authoring Input
70
Define Approval Status
68a
68b
Generate New Reusable Solution
Export 2nd Set of Aircraft Data
52

FIG. 3

44

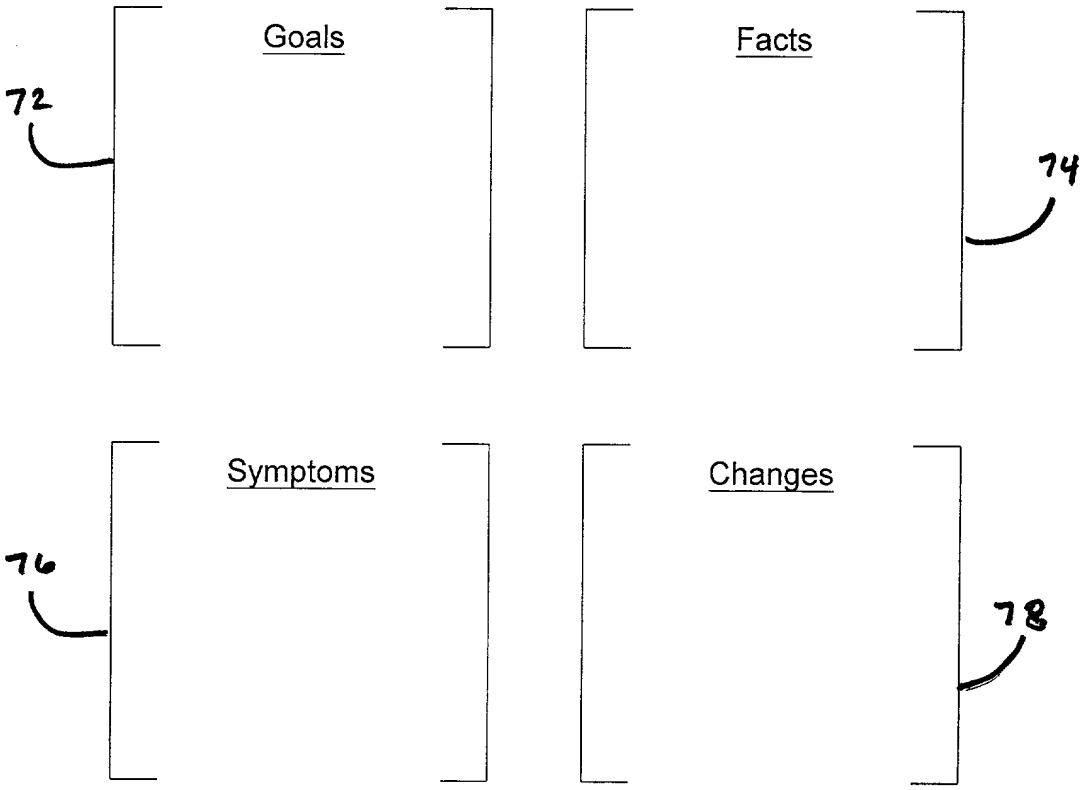

FIG. 4

54

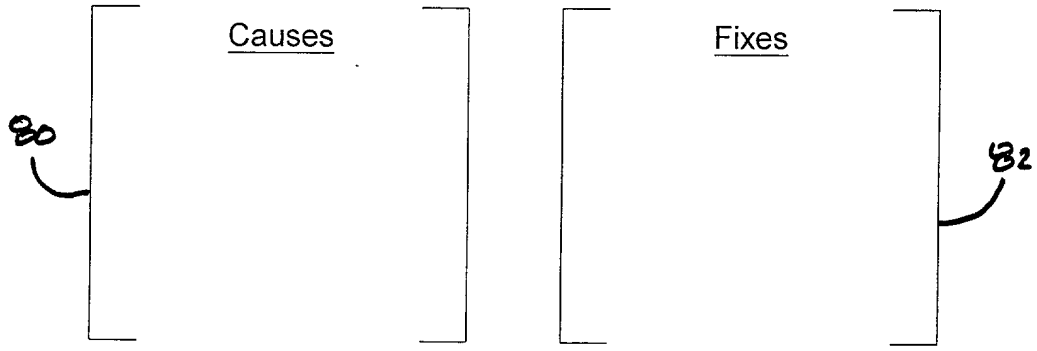

FIG. 5

Express Mail

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No. 7784-000203
Mark D. Elchuk, Harness Dickey & Pierce, (248) 641-1600

24

Service Engineering

Reusable Solutions

- How To Use The Tool
- Tool Kit
- Primus Info
- Training Schedule
- Integration with BOECOM
- Top Ten Questions
- Structures Issues
- Project Overview
- Go to Production Tool

Take a Guest Tour

6,143 solutions available
1,320 approved for SE statu
312 approved for Boeing/ Custome
Goal

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BOEING PROPRIETARY

FIG. 6

This Tour gives you Read Access to the Production Data through a Guest account. Training is needed in order to effectively use the tool, but we are comfortable enough with the tool's intuitive nature and want you to see it first hand. The success of your search is subject to the limited amount of data currently in the tool. Contact Us if you have any questions.

User Name: Guest

Password: boeing (lower case)

Domain: bcsr@bcsrd (menu)

Place a significant amount of information in one or all Search Fields and select Search in upper left corner. Appropriately, Use the New Session and Logout buttons on the left.

88

Login to Service Engineering Tool

86

Login to Field Service & Customer Tool

FIG. 7

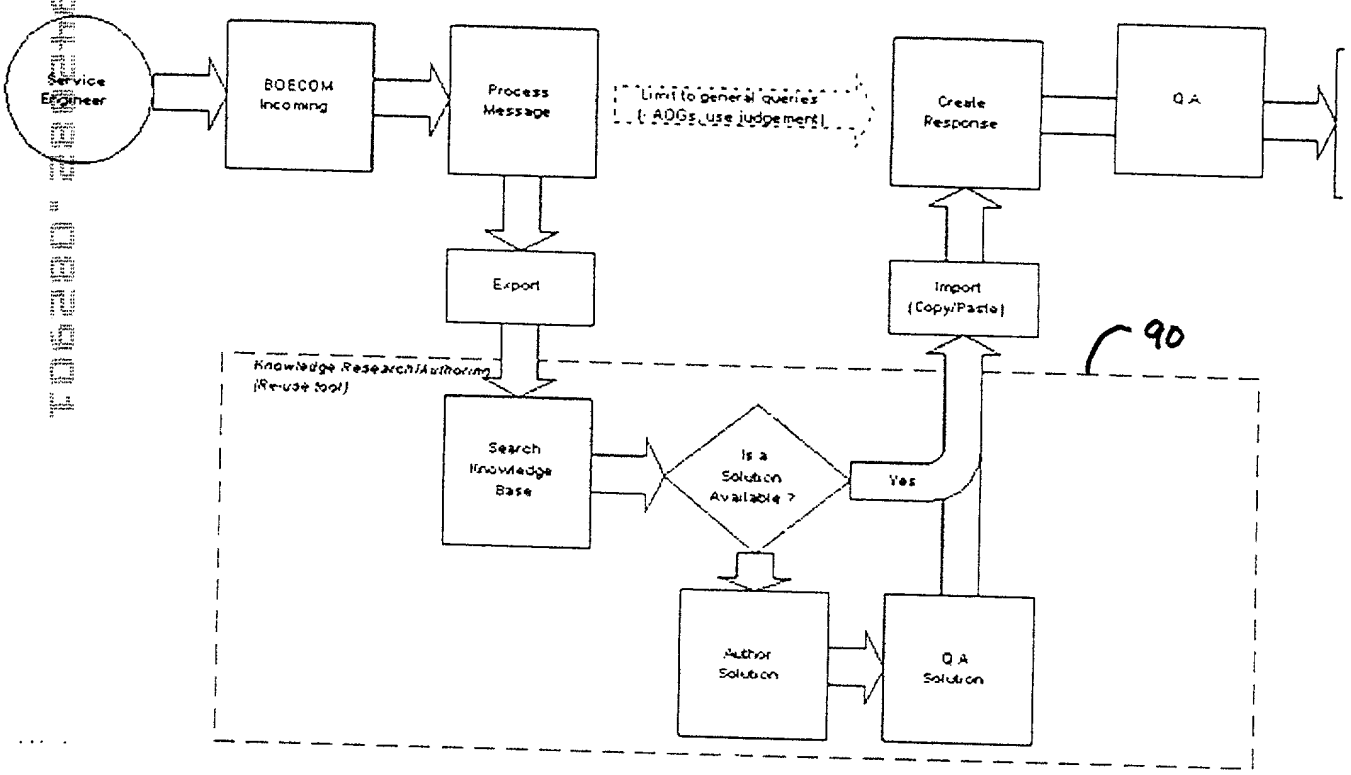
Service Engineer
BOECOM Incoming
Process Message
Limit to general queries
(ADGs use judgement)
Create Response
Q A
Export
Import (Copy/Paste)
90
Knowledge Research/Authoring (Re-use tool)
Search Knowledge Base
Is a Solution Available ?
Yes
Author Solution
Q A Solution

FIG. 8

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784-000203
Mark D. Elchuk, Harness Dickey & Pierce, (248) 641-1600

PRIMUS

Goal

A Goal statement is a clear statement of your customer's objectives—what the customer is trying to do or the question. Good Goals help the troubleshooting process. A Goal statement also serves as the solution's title. ALL SOLUTIONS MUST CONTAIN AT LEAST ONE GOAL.

Examples of Good Goal Statements

Goal: How to repair a 3-inch longitudinal crack on the P&W 4000 engine nose cowl?
Goal: What are the operational restrictions to be followed for a "gear down" dispatch?
Goal: Resolution of electrical power loss condition.

Fact

Fact statements should be formal and detailed, including as much information as necessary to *uniquely* identify the product being described, such as: model, ATA, part number. Fact statements may also be clarifying statements that are 'constant'.

Examples of Good Fact Statements

Fact: Model: 747-400
Fact: ATA: 2161-00 Temperature Control Zone System
Fact: P/N: 60B92400-10 Fuel Boost Pump Pressure Switch
Fact: Condition occurred during landing

Facts Help Classify Problems

1. Do *not* put *multiple* Facts in a *single* statement.
2. Modify existing solutions to add new Facts as needed:

Symptom

Symptoms tell us what problems the customer is having. The conditions or events being observed that suggest or indicate something is discrepant (for example, flight deck effects, pilot reports).

1. Don't create "compound statements"—*keep the **Facts** out of the **Symptoms** if you can.*

   Don't:
   Symptom: Smoke coming out of the engine during landing on 737-200 approaching Singapore

   Do:
   Fact: Model: 737-200
   Fact: Condition occurred during landing
   Symptom: Smoke coming out of the engine

2. Make the thoughts complete:

   Do:
   Symptom: No. 2 Engine smoking on startup.
   Symptom: 3 inch crack on inboard midflap torque tube

Flight Deck Messages: <exact message text >
Symptom: EICAS: AUTO SPEEDBRAKE
Symptom: CMC: 27-18830 GEAR TILT PRESSURE (L)

Ordering Symptoms

If your solution has multiple Symptoms, order them in the solution as follows:

- More detailed first
- Less detailed second

Example of Good Symptom Statements

If a customer reports getting the message EICAS: FIRE CARGO AFT on 747-400 and fire warning bell on:
Fact: Model: 747-400
Symptom: EICAS: FIRE CARGO AFT
Symptom: Fire warning bell on

Change

What has changed recently, or what maintenance actions were completed before the anomaly occurred? Not what was changed during the course of troubleshooting.

1. Think about what the customer may have done:
Change: Replaced actuator.
Change: New wiring installed.
2. Changes are not the *cause*–don't confuse the two.
3. Do not jump to conclusions:

Don't:
Change: *The system worked before we* installed a *faulty* processor card.

Do:
Change: Installed a new processor card.

The Root Cause as the Key to Solutions

There should be only *one cause per solution.* If a solution has more than one possible Fix, is it the *same* problem or is it a *similar* problem? If it's the *same* problem, then its *cause* is identical. In this case, the solution may contain more than one Fix statement—*but all Fix statements must be applicable.*

If you must decide between applying one Fix statement or another (because only one will work), the solution should be split into two!

1. Share as many common statements as possible among solutions.
2. Add unique statements to differentiate solutions.

Fix

Fix statements are the resolution of the problem. They resolve the customer concern, or provide the answer to the question.
Author the *Fix* as a stand alone

- Add Notes within the Fix as needed to improve readability or to identify its applicability
- If several steps must be performed in order, number the steps.
- Write using present tense.
- If a Solution is long and refers to multiple documents, list them as named references within the Fix and use the named reference numbers within the fix.
- Make sure these references are also recorded as *Facts* for the solution.
- Use spaces to format the statement for readability.
- Write everything as a present tense list of commands, as if you were reading them step-by-step to the customer.
- **Do not include "if-then" statements in Fixes.** This is an indication that you have two separate solutions.

A Great Sample Solution

Goal: Repair heat damaged strut stringer.
Fact: P/N: 65B98746-12 STRUT STRINGER
Fact: Model: 747
Fact: JT9D-7 inboard engines
Symptom: Conductivity readings in excess of 39
Symptom: Heat damaged strut.
Cause: Bleed air valve leak
Fix: 1. Reinforce the stringer with a nested angle fabricated from 2024-T6, 0.125 min gauge.
2. Fasten with existing fastener locations.
3. Maintain 2D spacing and 1.4D edge margin

HTML Syntax used to link to files/solutions.

linked Primus web site

Linked Solution where xxx is the local prefix and ### is the number of the solution

Linked Network file

<img src="http://address with full file name and 'image type' extension"> Rendering an image of a network file (jpg, gif, bmp, etc.)

Tables: save table as an 'HTML' file, view in a browser, copy 'source' and paste into role (html)

STEPS TO CREATING A SOLN.

1. Search for an existing solution, use Matching statements to help. Only create a solution if you can not find an existing one.
2. Open the **Create New Solution Frame**
3. **Add statements**, using diverse and appropriate statement roles as described here, but **especially multiple symptoms and changes.**

   - **Be explicit.** For example saying 'won't actuate' is unclear -what won't actuate? It is better to say: 'Leading edge flap drive unit won't actuate'.

   - Write using **present tense.**

   - In a 'fix' don't tell us what you did; **tell us what to do** in a step by step and complete process.
4. **Find matching statements**, adding or replacing as applicable. It is very important to reuse existing statements for better search efficiency and higher quality solutions
5. Optional: add hyperlinks to other solutions or files
6. Check for duplicate solution: Select 'copy to problem description as Current Id'. If a similar or nearly duplicate solution exists, consider consolidating the two into one solution
7. Be sure to have a **meaningful and useful title.** (comes from 1st goal, or as defined in 'properties')
8. **Check spelling**
9. Change default **Property** values as necessary. **Status** default is **'draft'**. Set **Type** to either **'systems'**, **'structures'**, or **'non-technical'**.
10. **Save the solution.**

Properties - Status

Draft:
This is the default at time of initial creation and for work in progress. A Cause and Fix may or may not have been determined; additional data may be needed to complete the solution.
Review:
Solution contains a Fix (and cause if applicable) and is ready to be reviewed for content standards and technical correctness.
Approved for SE Group: Solution has a Fix (and Cause if known), it has been reviewed and has undergone QA and is approved for use by the SE.
Approved for SE: As above, but approved for viewing by SE group SME.
Approved for Boeing:
As above, but approved for viewing by Boeing.
Approved for Customer:
As above, but approved for viewing by customers.
Return:
An approved solution requiring updating.
Obsolete:
Retained for background information.

Detailed Criteria for the "Approved" Status levels are provided on our web site under Approval Process, Solution Approval Criteria.

Things you don't need to say!

Because each Primus application statement is assigned a role, certain phrases are *unnecessary* when writing statements:

*"I want to," "The customer is **trying to**"*

*"The customer is **using**..."*

*"The customer is **getting**..."*

FIG. 9

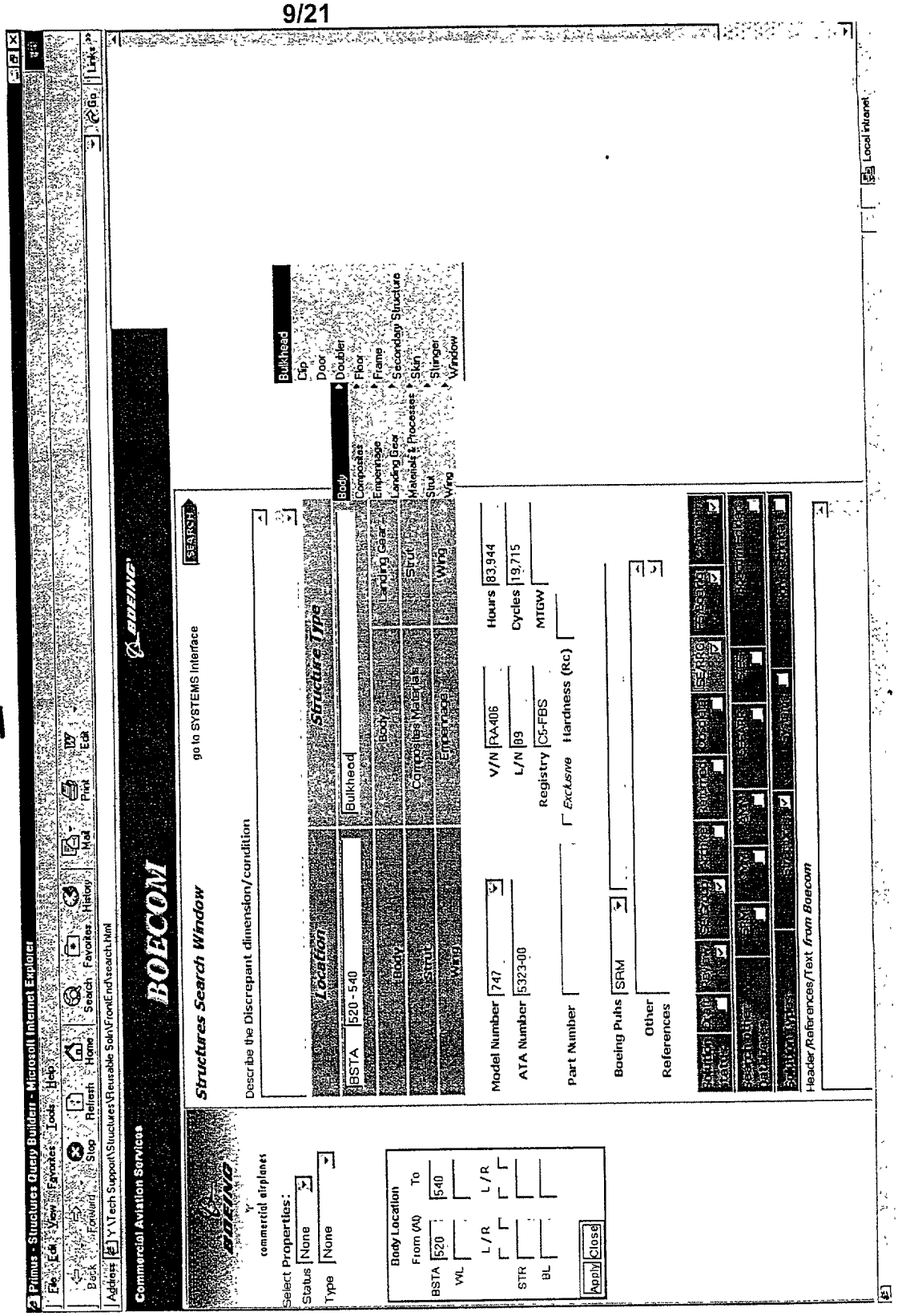

FIG. 10

FOLDED" 08/04/03

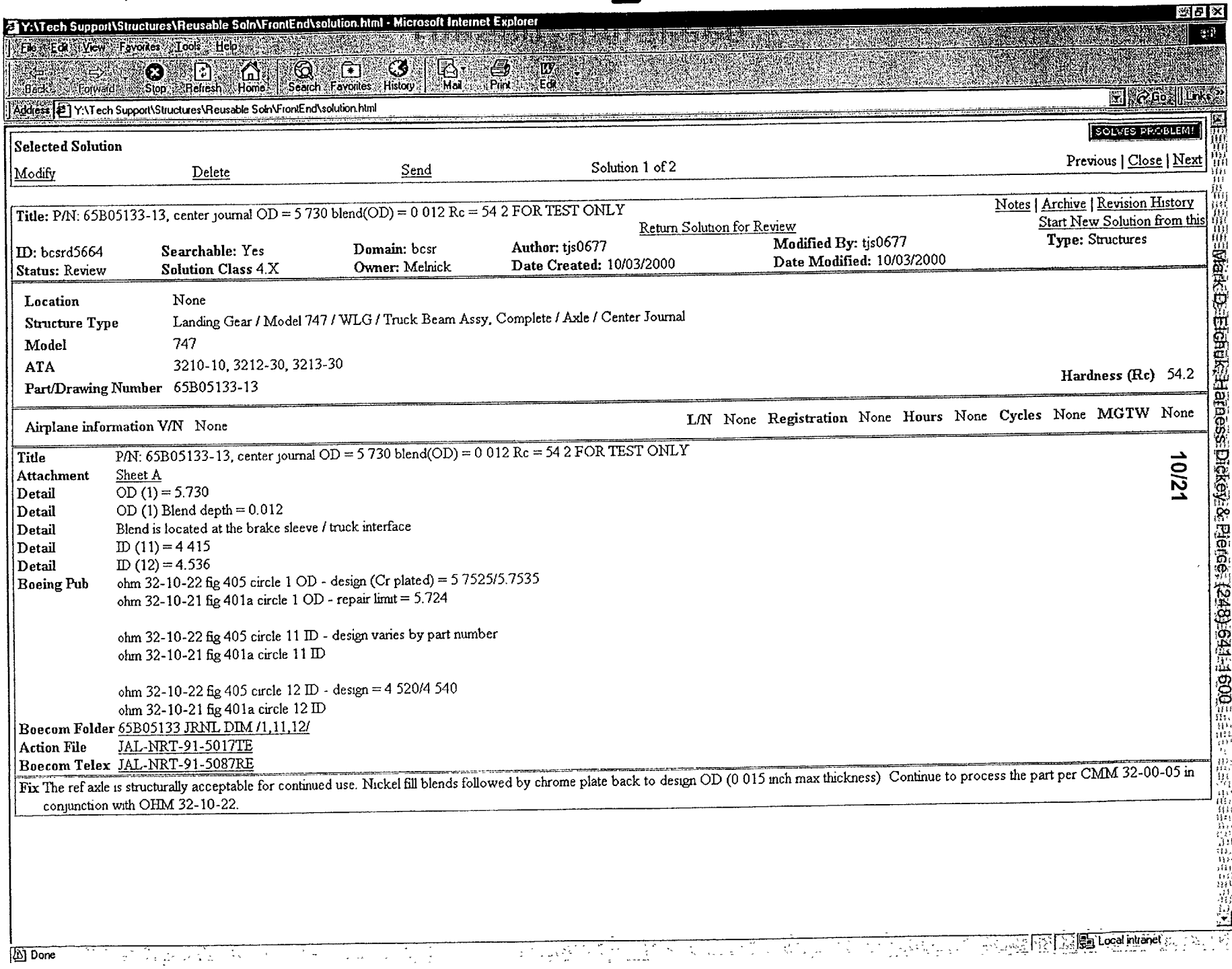

FIG. 11

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784-000203
Mark D. Elchuk, Harness Dickey & Pierce, (248) 641-1600

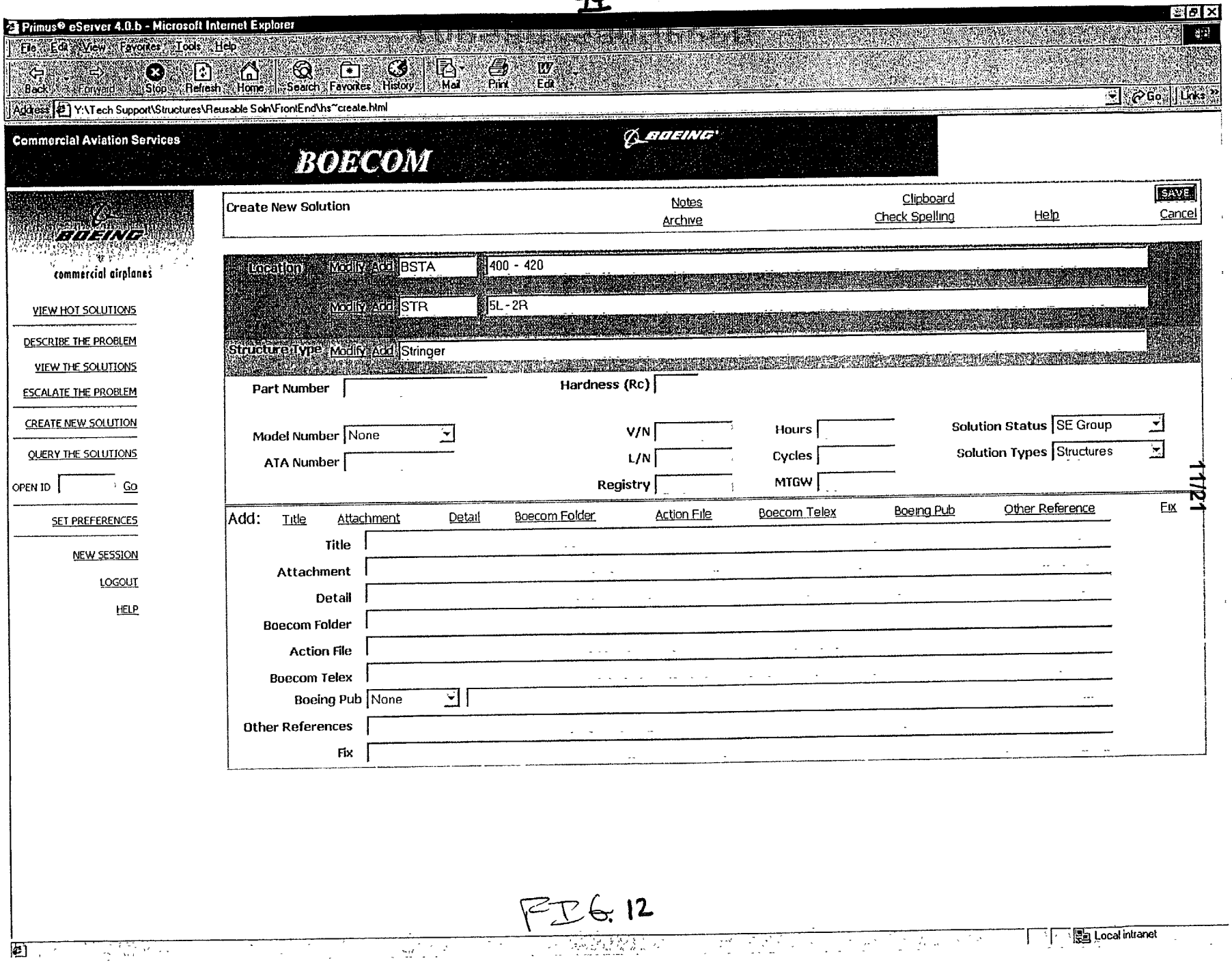

FIG. 12

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784-000203
Mark D. Elchuk, Harness Dickey & Pierce, (248) 641-1600

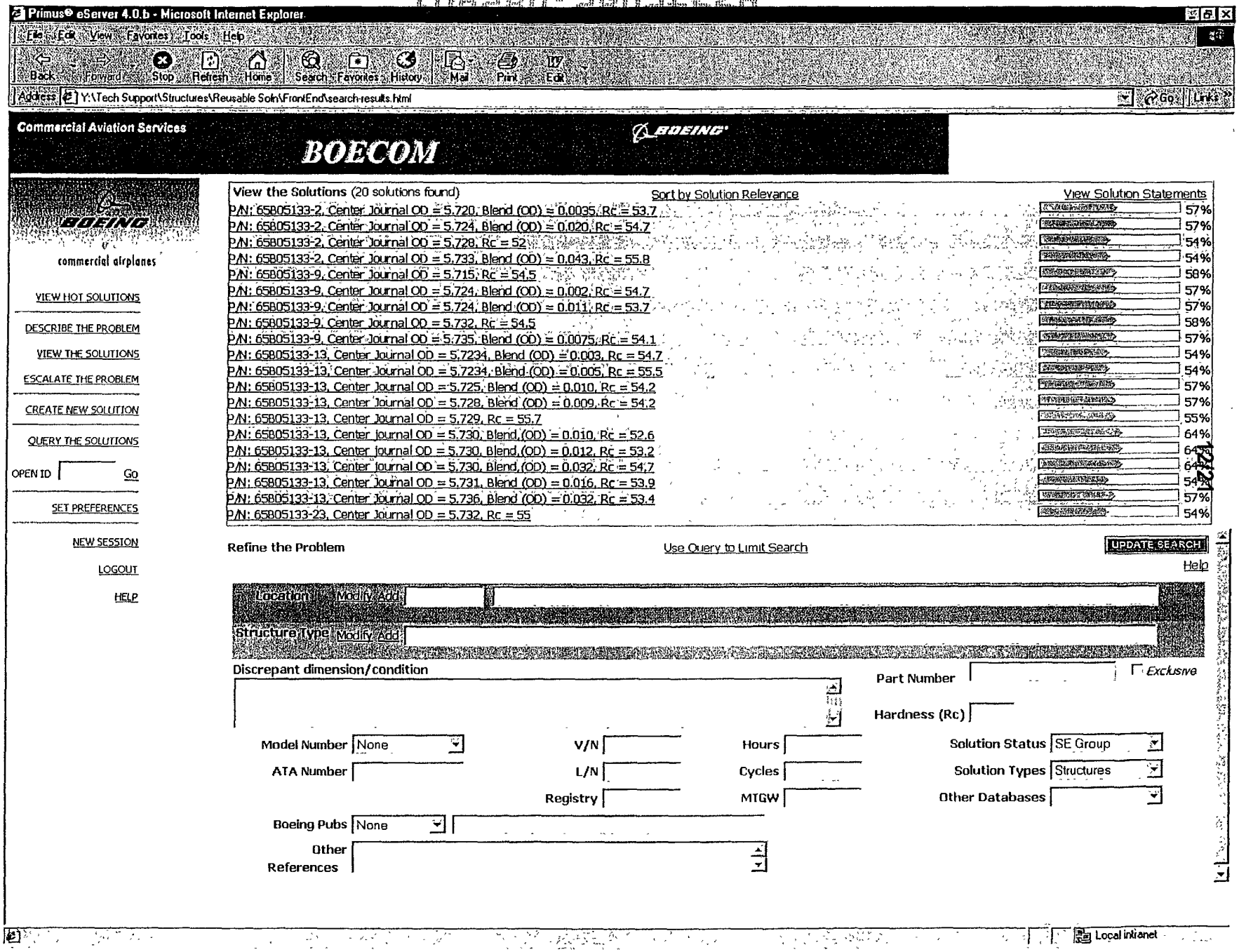

FIG. 13

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784-000203
Mark D. Elchuk, Harness Dickey & Pierce, (248) 641-1600

Incoming Message

Draft or Incoming Message

Action File Name:* FIS-06-DEC-99-D489

Prep Date: 06-DEC-99

Author:* Rudolph

Group:* FIS

Model:* 737

ATA:* 570-40

Opr:

Base:

Airline Support:*

DEP:*

Due Dates:

Home Office:

Field:

Subject: Aluminum Spoiler Fitting Spherical Bearing Bore Corrosion

Draft Message Number:* FIS-06-DEC-99-D489

Type:* BOECOM

Airplane...

Start KB

Notes...

FIG. 14A

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784-000203
Mark D. Elchuk, Harness Dickey & Pierce, (248) 641-1600

Draft Outgoing Message

Draft or Incoming Message

Action File Name:* FIS-06-DEC-99-D489

Prep Date: 06-DEC-99

Author:* Rudolph

Group:* FIS

Model:* 737

ATA:* 5770-40

Opr:

Base:

Airline Support:*

DEP:*

Due Dates:

Subject: Aluminum Spoiler Fitting Spherical Bearing Bore Corrosion

Home Office:

Field:

Draft Message Number:* FIS-06-DEC-99-D489

Type:* BOECOM

Airplane...

Get Solution Text

Notes...

Repair by opening bore up by 0.060 and install a swaged sleeve

Fig. 14B

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784.000203
Mark D. Elchuk, Harness Dickey & Pierce (248) 641-1600

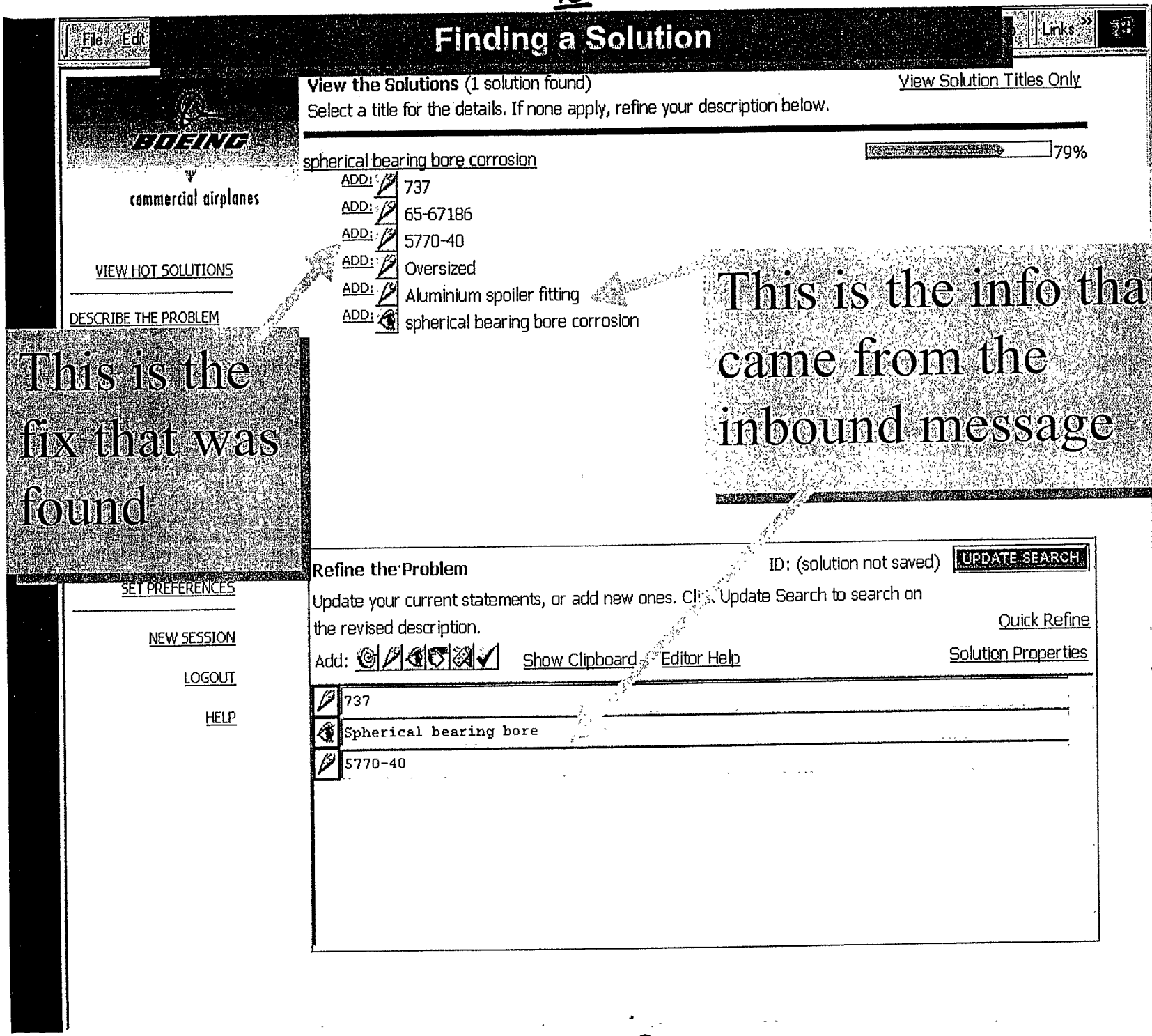

FIG. 15

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref No.: 7784.000203

A Typical Solution

SOLVES PROBLEM!

our selected solution:

Send | Solution 1 of 1 | Previous | Close | Next

Title: spherical bearing bore corrosion

Comments | History

Use as Problem Description

ID: 2.0.34838.2452666 **Domain:** boeing **Shared:** Yes

Owner: administrator **Partition:** Unassigned

Type: repair verification **Status:** Technical reviewed

Fact	737
Fact	65-67186
Fact	5770-40
Fact	Oversized
Fact	Aluminium spoiler fitting
Symptom	spherical bearing bore corrosion
Fix	Typical repair for this bore - Open the bore up by 0.060 and install a swaged sleeve:

previously structurally OK
-x opened up to 1.060 max and installed bushing

-8 opened to 1.008
-10 opened to 1.006 in this case there were wear marks on the faces/structurally OK for hard anodize

Notes: Overhaul manual reference 57-56-61 material 7075-T6
design diameter -4,-9,-10 is 1.000-1.003

FIG. 16

Here is the fix

16/21

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784.000203

Re-useable solution Search Window:

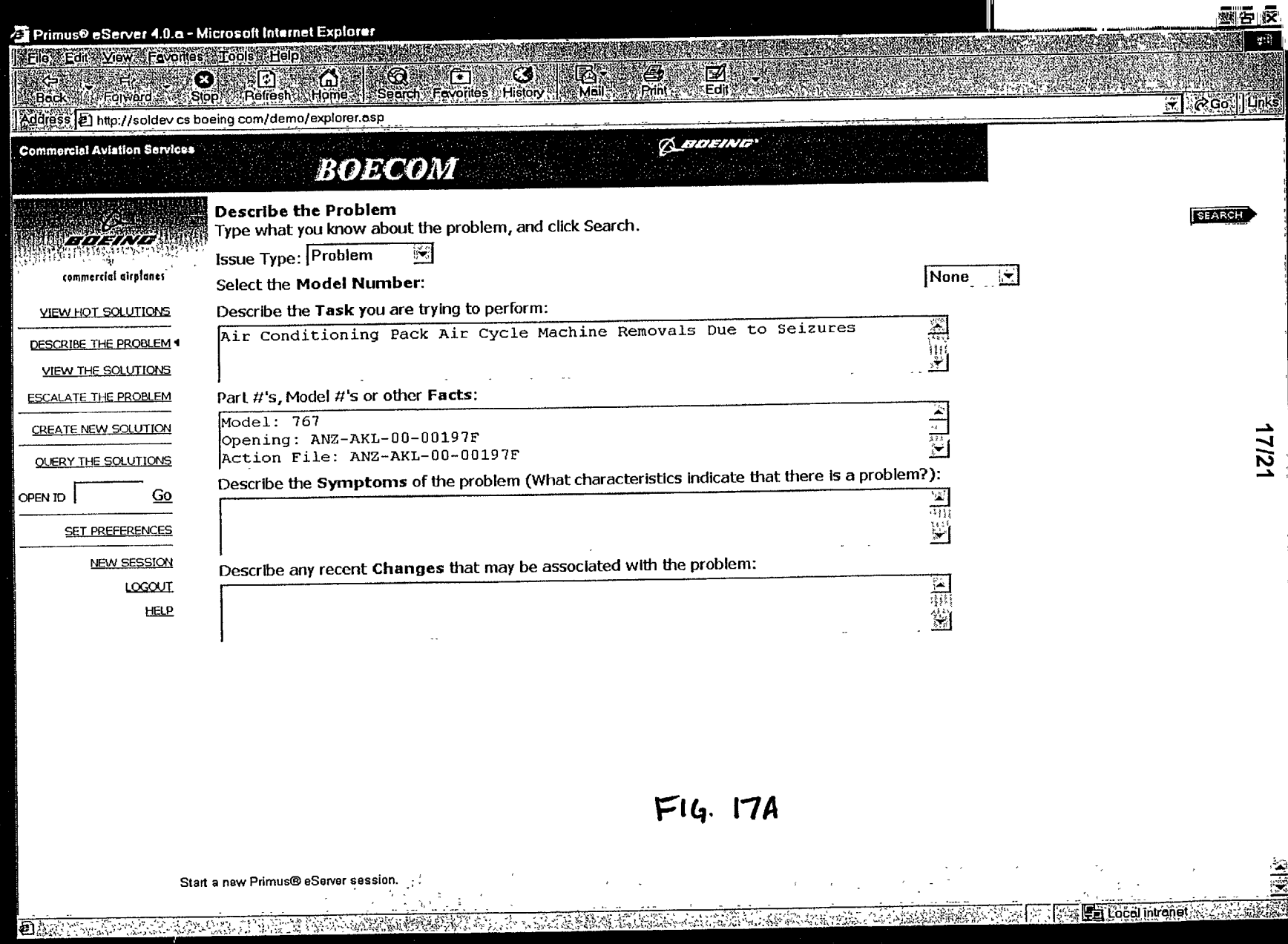

FIG. 17A

17/21

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784.000203

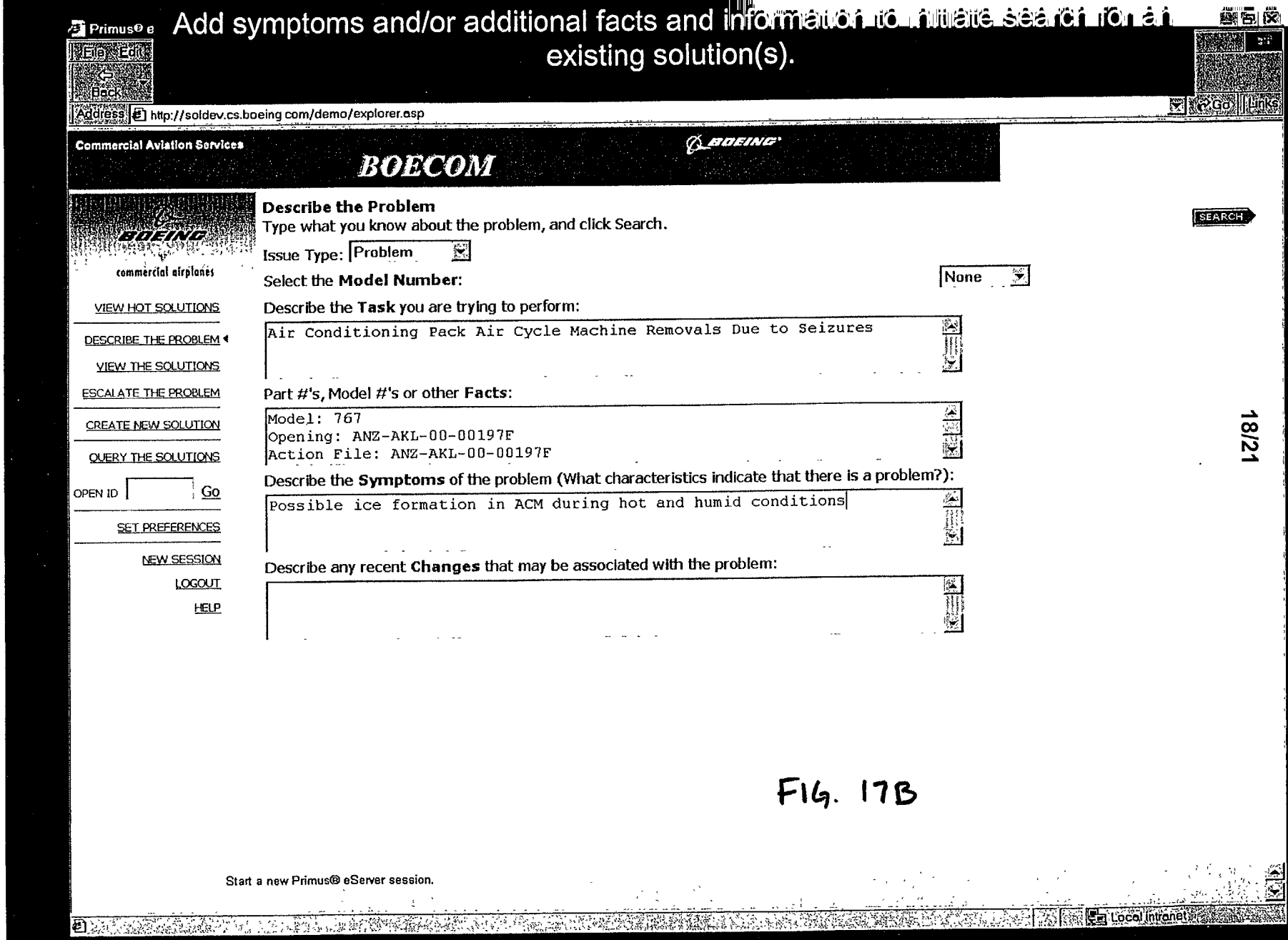

FIG. 17B

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784.000202

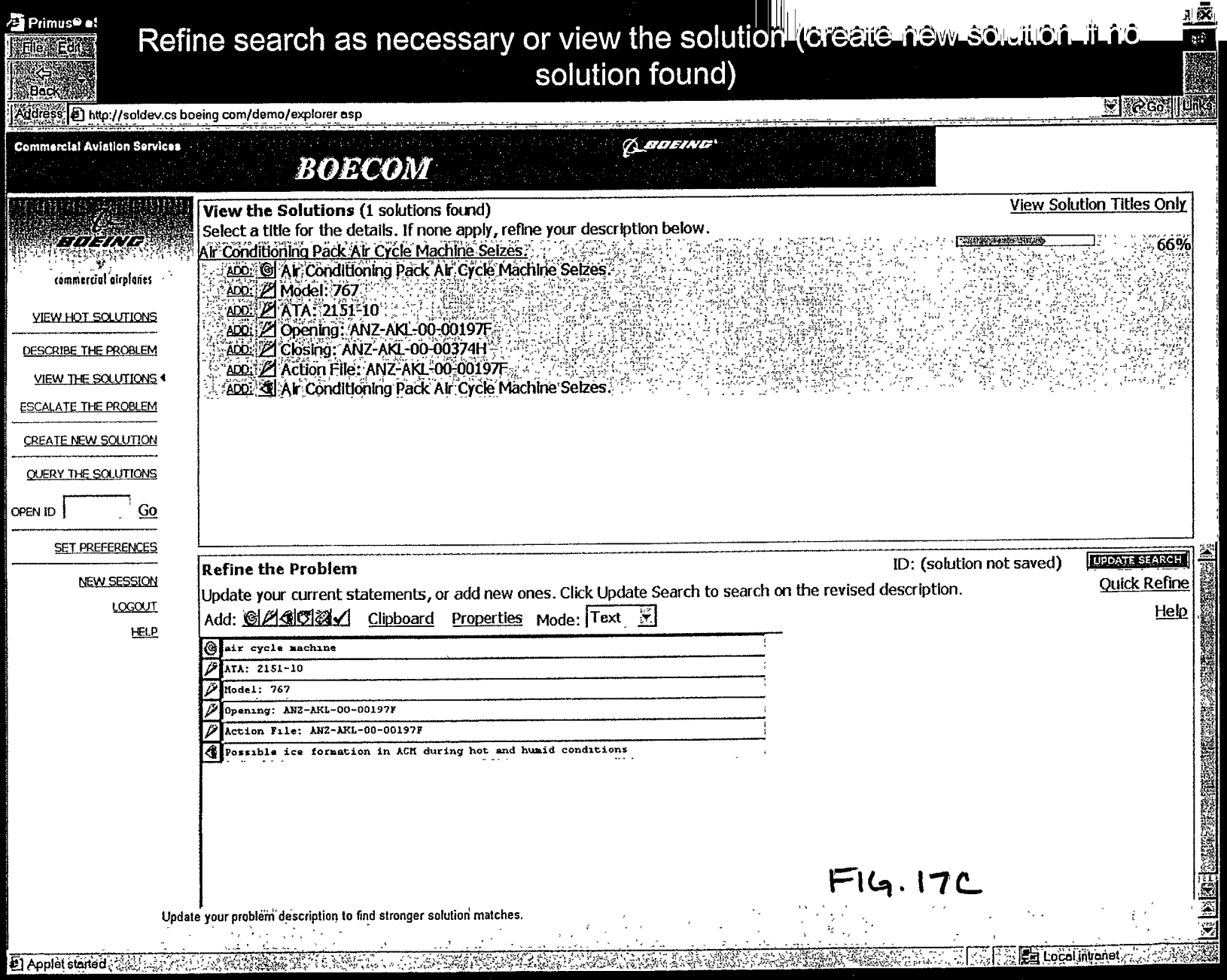
Refine search as necessary or view the solution (create new solution if no solution found)
Primus
File Edit
Back
Address http://soldev.cs.boeing.com/demo/explorer.asp
Go Links
Commercial Aviation Services
BOECOM
BOEING
commercial airplanes
VIEW HOT SOLUTIONS
DESCRIBE THE PROBLEM
VIEW THE SOLUTIONS
ESCALATE THE PROBLEM
CREATE NEW SOLUTION
QUERY THE SOLUTIONS
OPEN ID Go
SET PREFERENCES
NEW SESSION
LOGOUT
HELP
View the Solutions (1 solutions found)
View Solution Titles Only
Select a title for the details. If none apply, refine your description below.
Air Conditioning Pack Air Cycle Machine Seizes.
66%
ADD: Air Conditioning Pack Air Cycle Machine Seizes.
ADD: Model: 767
ADD: ATA: 2151-10
ADD: Opening: ANZ-AKL-00-00197F
ADD: Closing: ANZ-AKL-00-00374H
ADD: Action File: ANZ-AKL-00-00197F
ADD: Air Conditioning Pack Air Cycle Machine Seizes.
Refine the Problem
ID: (solution not saved)
UPDATE SEARCH
Quick Refine
Help
Update your current statements, or add new ones. Click Update Search to search on the revised description.
Add: Clipboard Properties Mode: Text
air cycle machine
ATA: 2151-10
Model: 767
Opening: ANZ-AKL-00-00197F
Action File: ANZ-AKL-00-00197F
Possible ice formation in ACM during hot and humid conditions
Update your problem description to find stronger solution matches.
Applet started
Local intranet

FIG. 17C

Export solution into Outgoing BOECOM message

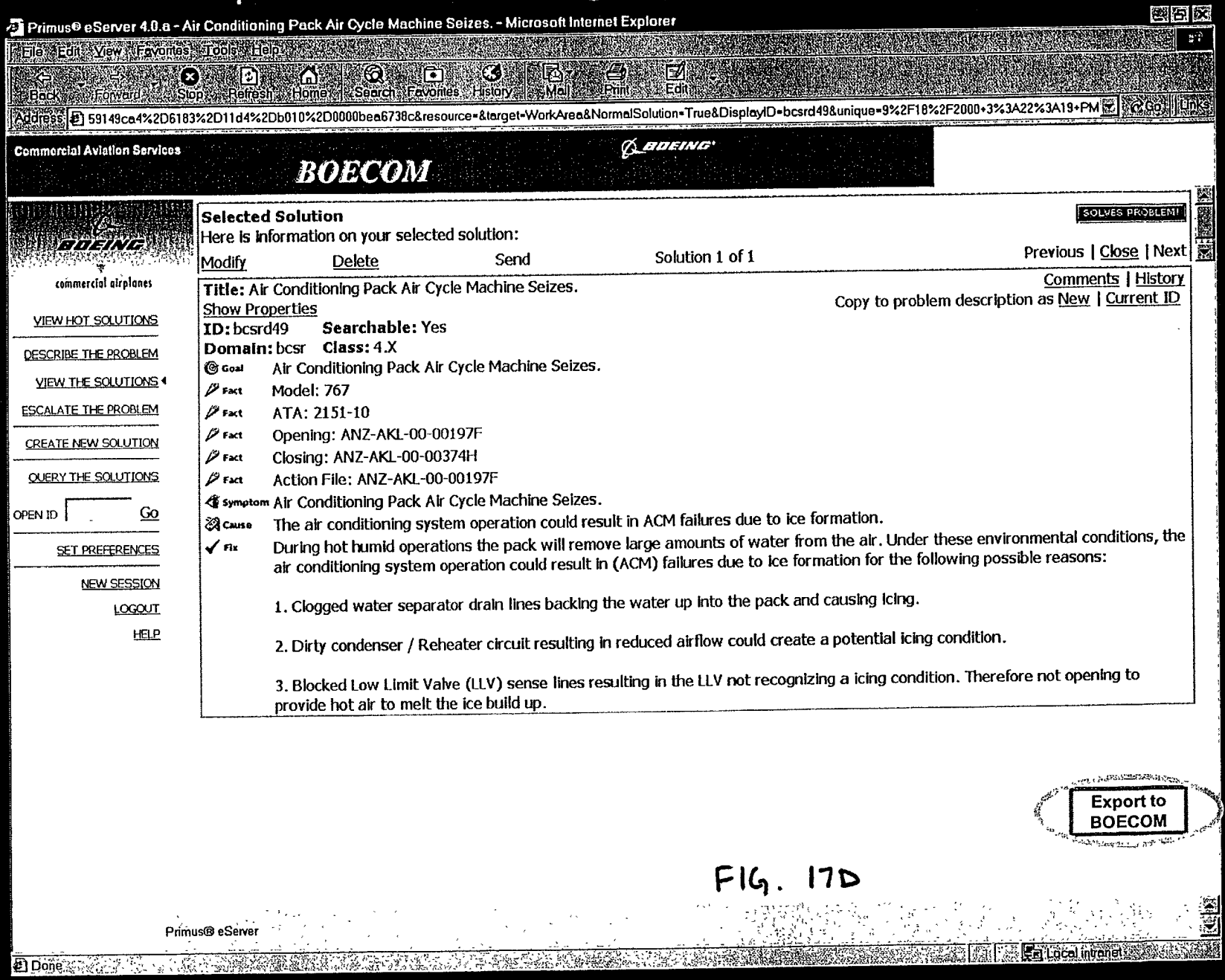

FIG. 17D

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al
Atty. Ref. No.: 7784.000202

Outgoing BOECOM message:

Fix will be copied to BOECOM Draft and BOECOM items will automatically
be passed from Primus tool when solution is used.

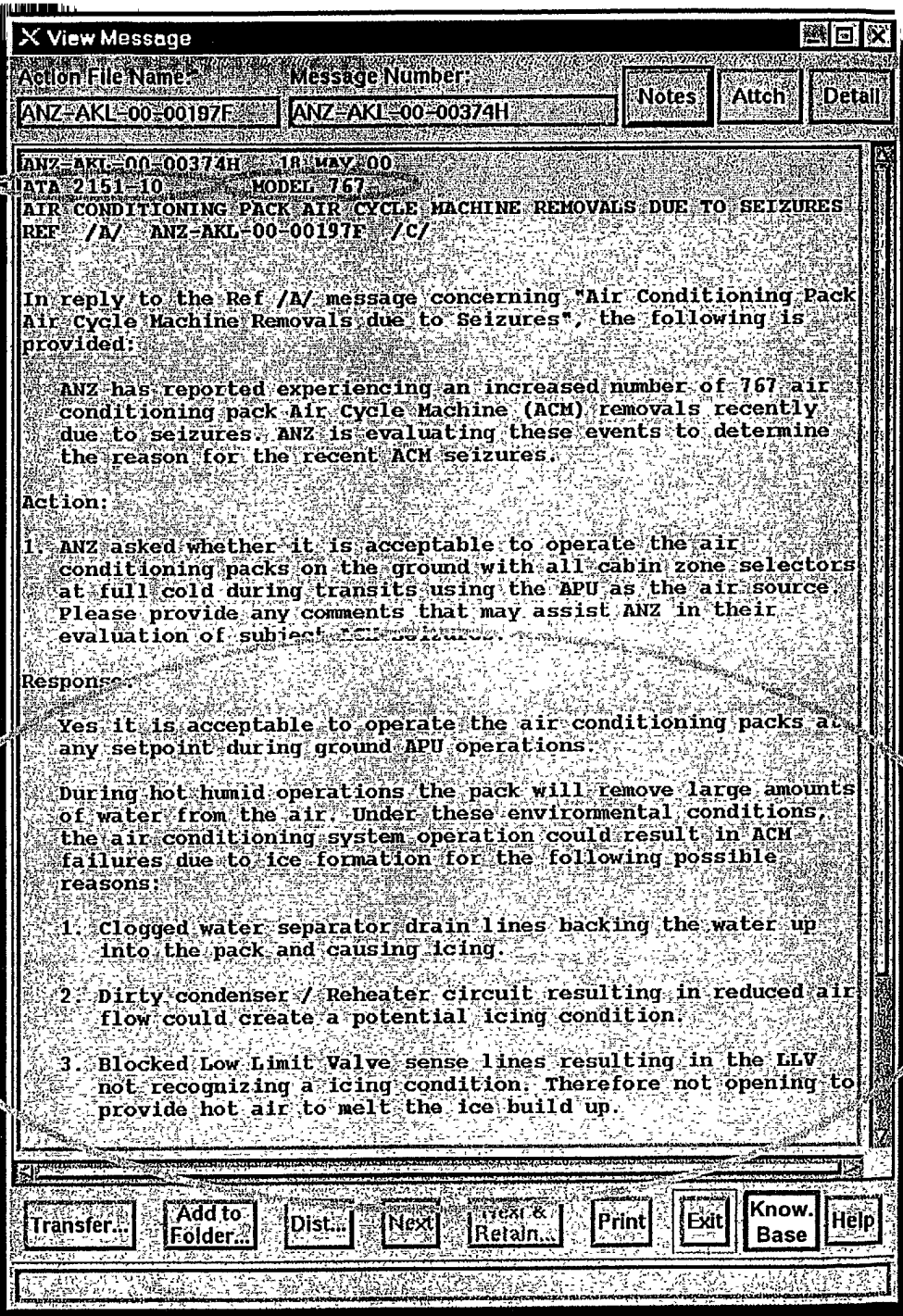

FIG 17E

Title: Reusable Solutions For Aircraft Servicing
Inventor: Norden et al